

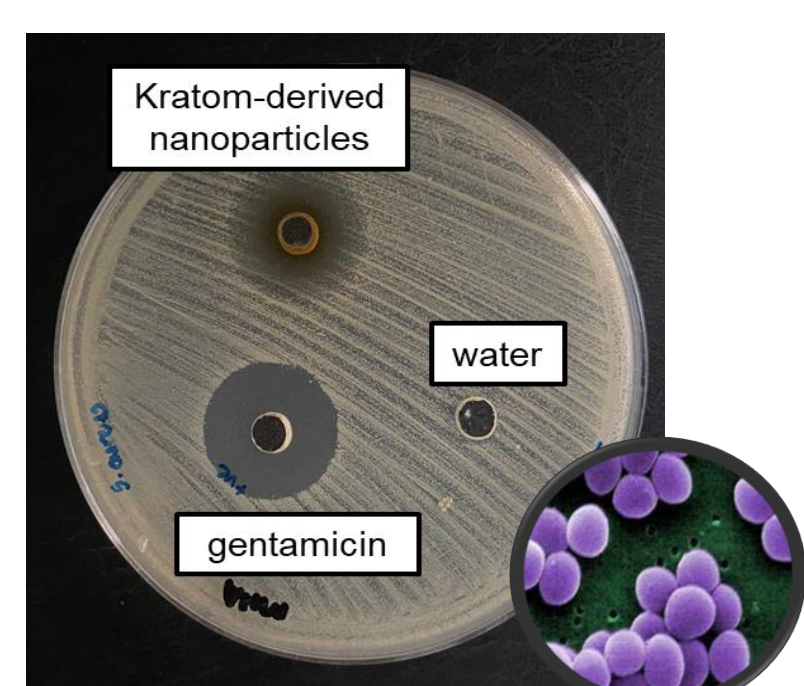


Kratom-Derived Nanoparticles

Emerging New Technology for Wound Therapy

Trade secret: TS2022112901

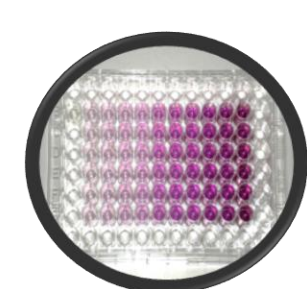
Biological Activities



Antimicrobial on
S. aureus:
 18.66 ± 0.7 mm



Cytotoxicity on
3T3 cell:
 $IC_{50} > 500$ μ g/mL



Antioxidant study

Total Phenolic Content (GAE/g)	Total Flavonoid Content (QE/g)	DPPH (IC_{50} , mg/mL)
90.88 ± 0.30	50.43 ± 0.47	0.03708 ± 3.54

TECHNOLOGY

The innovation relates to a new optimum formulation of kratom (*Mitragyna speciosa*) leaves extract-derived nanoparticles for wound therapy. The kratom formulation was formulated using high energy technique and optimized using Response Surface Methodology (RSM) which are cost effective, safe, conserve energy and time.

The nanoparticles system used was a lipid based nanoparticles where kratom (*Mitragyna speciosa*) leaves extract, oil, solid lipid, surfactant, deionized water, and preservatives were used at optimum composition and condition.

CURRENT ISSUES

The current lack of efficient treatments for wounds is dependent on many factors. Existing drugs for treating wound healing shown some side effects. For example, flavine usually was used for the treatment of minor wounds, infected wounds or minor burns.

However, prolonged treatment of flavine may delay the healing of wounds. This delay in wound healing may be due to flavine being a disinfectant and therefore kill new immature cells while having no inherent proliferative properties.

In this view, the shifting from synthetic drugs to natural plant-based that have less toxic, affordable and choices for healing different wounds seems to be promising due to the diversity of active compounds, ease of access and their limited side effects and low cost. However, kratom's low biocompatibility (poor absorption, low aqueous solubility) may hinder their effective delivery to the intended site of action into the skin.

A proper formulation system is needed to improve the biocompatibility of kratom that is suitable for pharmaceutical application.



Oil



Surfactant



Kratom leaves extract



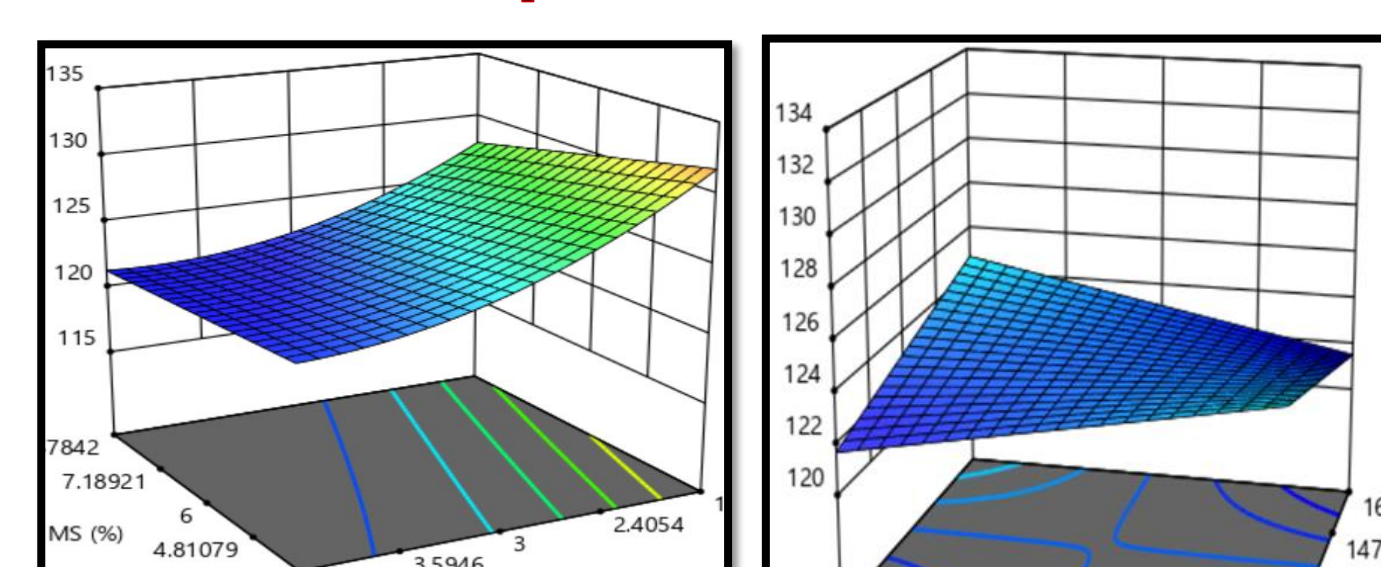
Solid lipid

Kratom-Derived Nanoparticles

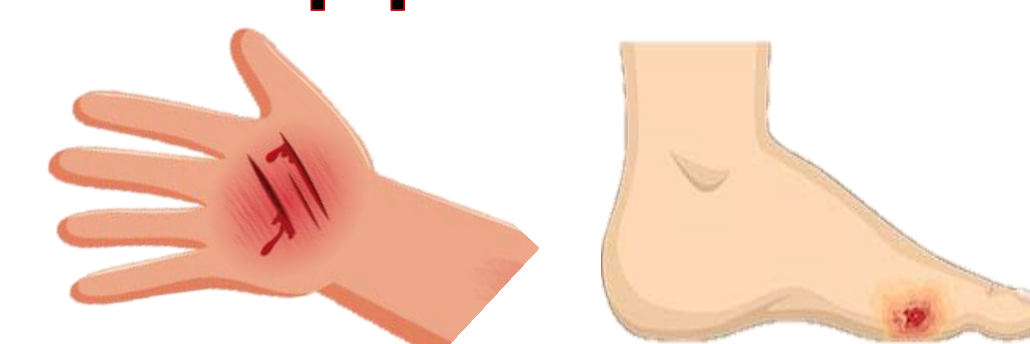
INVENTIVENESS & NOVELTY

The formulation of kratom-derived nanoparticles was prepared using high energy technique and optimization using Response Surface Methodology (RSM) approach to give optimum formulation and condition. Analysis of variance (ANOVA) showed that the fitness of the quadratic polynomial fits the experimental data. The biological activities showed that kratom-derived nanoparticles have good antimicrobial and antioxidant properties, and less toxic.

Optimization



Application



Wounded skin

USEFULNESS & APPLICATION

The active ingredients from plant-based material, Kratom leaves extract contained good antioxidant properties, antimicrobial activity and have low toxicity value that is suitable to be used as a wound healing mediator (burns, cut, diabetic foot ulcer).

IMPACT OF THE PRODUCT

Throughout the world, a huge percentage of population depends upon the use of plant-based medicine because they are readily available, cheaper, convenient and better healthcare alternatives. This proposed project is expected to develop a potential wound healing drug from plant-based source, Kratom (*Mitragyna speciosa*) which in line with the demand that offers an opportunity to reinforce its commitment in order to tap into the potential market.

MARKET POTENTIAL

- Pharmaceutical Industry (pharmaceutical products)
- Hospital or clinics (alternative medical treatment)

TRL 2- Formulation of Concept



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